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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,668	10/16/2000	Richard Ian Laming	DYOUP0203US	3601

7590 10/06/2004

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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 10/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/688,668	LAMING ET AL.	
	Examiner	Art Unit	
	Martin J Angebranndt	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *7/15/2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 27-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 27-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

1. The response provided by the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they were directed. Rejections appear below.

2 The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3 Claims 1-11 and 40 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The applicant's representative has not made the effort to point out where in the specification, a basis appears for specifically excluding "tuning of the discrete phase shift". The assertion that the language suggested by the examiner is overly restrictive fails to appreciate that a basis for that suggested language actually appearing the specification and therefore is legally defensible. This is the only reason that the examiner had suggested that language.

The applicant must point to the specific language relied upon in the specification as filed for the language excluding "tuning of the discrete phase shift", or if a basis cannot be found, then the new matter must be removed in the next response.

4 The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5 The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6 Claims 27-29,31,32,34 and 39 are rejected under 35 U.S.C. 102(b) as anticipated by Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997), in view of Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994).

Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) teaches the formation of a single polarization DFB laser in a Er doped fiber. These are desirable for coherent communication, spectroscopy and as a reference source as the output is a single frequency (page 57, top left paragraph) The single polarization is the result of induced birefringence in the grating recorded in the fiber. The birefringence is described as being dependent upon the polarization of the UV writing beam. The birefringence is 5% for the s-polarization, which is perpendicular to the axis of the fiber. Conventionally, the gratings are written using p-polarization, which results in only 0.5% birefringence. The technique for writing the gratings is described with respect to reference [4], which is Erdogan, et al., "Charachterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994). (page 57/ left column, second

paragraph). The exposure, followed by the tuning of the space between the two gratings for a specific phase shift using UV exposure is disclosed. (page 57/ left column, third paragraph)

Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994) teaches the induced birefringence of in optical fibers where the s polarization is defined as where the polarization of the incident UV beam is perpendicular to the axis of the fiber. (pages 2102, left column, experimental section).

The examiner holds that either Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) used the methods of Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994) which are specifically referred to in the paper and the invention is anticipated or alternatively it would have been obvious to use modify the process of Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) used to form the DFB laser by using the methods of Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994) based upon the direction to do so.

The applicant argues that the claimed process is to a one step process for forming single mode fiber laser. The examiner notes that the use of "comprising" language opens the interpretation of the claims to additional steps. The examiner notes that there is a difference between the two beam recording methods of Erdogan, et al. and Storoy et al. and the single beam grating used in the disclosure with respect to figure 3a. The examiner notes that the use of two s-polarized beams inherently would be expected to produce equal phase shifts for the modes based

upon the use of the proper polarization being maintained in the s-polarization **for at least the intermediate article** (before the phase adjusting step). **The applicant might have some evidence that indicates that the two different techniques yield different results. The record of the prior art teaches them to be equivalent. (Byron '442 in column 1)** The examiner notes that there is no requirement for a DFR structure to be formed in the claims. The examiner adopts the position that the phase shift of the two different polarizations is arbitrary based upon the amount of exposure, but equal for both polarizations. The examiner notes that the birefringence is only measured at a single polarization and therefore the reference does not teach away as argued. The position that Erdogan, et al. is not combinable with Storoy et al. ignores the fact that the specific methods is described with reference to Erdogan, et al. The rejection stands.

In the Storoy et al. reference two gratings were written each with the s-polarization. The resulting gratings exhibits birefringence of approximately 5%. This specifically results in a difference in gratings strength, which is a limitation in the instant claims. The reference describes the two gratings as having an arbitrary phase shift between them. This phase shift is adjusted by tuning one of the gratings by exposure to UV light. The result is a single mode fiber. The instant claims are directed to methods of forming a single mode fiber where there is a difference in the gratings strengths of the two orthogonal modes of the fiber to produce strong polarization discrimination. (specification at page 2/lines 7-14). The claims are open to plural exposures, including that of the Storoy et al. reference based upon the use of "comprising" language. The process described in GB9617688.8 (GB 2316760) uses a overlap of successive gratings exposures through a photomask to form the pattern as illustrated in figures 2a-c and 3a-b. The result of the process described in GB 2316760 is a single DFB grating, rather than two

separate gratings with a phase difference between them such as described in the Storoy et al. reference. The phase shift induced by the UV exposure would be the same for both polarizations, but the refractive index variation in the steps making up each grating differ in their strengths. The birefringence of the grating and the strength of the phase shift occurring in the grating structure are two different things. The process of GB 2316760 uses plural exposures, but only grating exposures, so in the case of the DFB grating formed, these are more closely interrelated than when a separate exposure is used. The arbitary phase shift produced in the grating exposures of GB 2316760 are the same for both modes, just not the desired result. The claims do not even recite a DFB grating being formed. The examiner holds that currently, the instant claims are either anticipated or rendered obvious by the Storoy et al. reference and the rejection stands.

To obviate this rejection and those dependent upon it, the applicant should incorporate a detailed description of the technique from GB 2316760, in place of the reference on page 4 at lines 27-29 as required under 35 USC 112 and insert language **describing the use of plural grating exposures with stepping or movement between the exposures to form a DFB grating *without post processing into the claims*** to form the optical fiber laser with the recited differences in grating strength and identical phase shifts for the two orthogonal polarization modes. This is due to the use of tuning of the phase shift in Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) and there is no motivation in the prior art to remove this step.

The examiner points out that merely the exposure to form a grating using the S-polarization meets the claims limitations of claim 27. The examiner notes that the formation of

the intermediate grating product using the two interfering S polarized beams in the reference appears to anticipate the claimed invention. The examiner notes that the claims are not limited to a DFB gratings, nor do they describe plural exposures.

7 Claims 27-32 and 34-37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) **alone or combined with** Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994) as discussed above, in view of Byron '442.

Byron '442 teaches the writing of gratings while applying strain to the fiber. This allows a uniform period grating mask to be used to record chirped gratings (abstract, columns 2-3). The varying of the tension in either stepwise or continuous manner is described (3/1-3). The use of a frequency doubled argon ion laser with an output of 244 nm is disclosed as useful for writing the gratings. (3/25-31)

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the invention of Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) **alone or combined with** Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994) as discussed above by using the 244 nm output of the frequency doubled Argon ion and/or placing strain on the fiber during grating recording as taught by Byron '442 based upon equivalent function for the laser wavelength choice and to form chirped gratings using a uniform period grating mask.

The rejection stands for the reasons above.

8 Claims 27-37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) **alone or combined with** Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", ", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994), in view of Byron '442 as discussed above and further in view of Dong et al. '197.

Dong et al. '197describes Yb/Er doped fibers as more desirable due to their 100 fold larger absorption over Er only systems. (2/1-10)

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the invention of Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) pp. 56-58 (1/1997) **alone or combined with** Erdogan, et al., "Characterization of UV-Induced Birefringence in Photosensitive Ge-Doped Silica Optical Fibers", ", JOSA B Vol. 11(10), pp. 2100-2105 (10/1994), in view of Byron '442 by using the more sensitive Yb/Er fibers based upon the disclosure by Dong et al. '197 that they have a higher absorption.

The rejection stands for the reasons above.

9 Claims 1-6,8,10,11,27-31,32,34 and 36-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizrahi et al. 239 and Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997).

Mizrahi et al. 239 teach forming gratings which vary in their periodicity along their length by changing the angle between the beams during the exposure and while shifting the point of irradiation and without changing the registration of the pattern at any pointing on the fiber

(5/14-68). A shift of up to 4% in the periodicity may be achieved if wavelength variation is used to vary the periodicity (4/39-52). The irradiation light used is 245 nm from a frequency doubled dye laser (4/14-16). The variation in the amount of exposure as a function of the position of the beams on the fiber is disclosed. (6/1-27). As the pump laser is an excimer, the laser light is pulsed and plural exposures are made in the process.

It would have been obvious to one skilled in the art to modify the process of Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997) by using the continuous variation in the gratings period to continuously form the desired DFB/DBR pattern without the need for tuning to vary the periodicity of the grating.

10 Claims 1-6,8-11,27-32 and 34-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizrahi et al. 239 and Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997), further in view of Byron '442.

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the invention of Mizrahi et al. 239 and Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997) as discussed above by using the 244 nm output of the frequency doubled Argon ion and/or placing strain on the fiber during grating recording as taught by Byron '442 based upon equivalent function for the laser wavelength choice and to form chirped gratings using a uniform period grating mask.

11 Claims 1-11 and 27-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizrahi et al. 239 and Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997), further in view of Byron '442 and Dong et al. '197.

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the invention of Mizrahi et al. 239 and Storoy et al. "Single Polarization Fibre DFB Laser", Electron. Lett., Vol. 33(1) (1/1997), in view of Byron '442 by using the more sensitive Yb/Er fibers based upon the disclosure by Dong et al. '197 that they have a higher absorption.

12 Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13 Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Martin J Angebranndt
Primary Examiner
Art Unit 1756

10/4/2004